

Van Norden Meadow Restoration & Recreation Project

Purpose and Need and Proposed Action



Forest Service
U.S. Department of Agriculture

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Introduction

The Truckee Ranger (TRD) of the Tahoe National Forest (TNF) is proposing the Van Norden meadow Restoration and Recreation Project (hereafter the Project). The Project will restore 485 acres of meadow and meadow edge habitat and establish a non-motorized trail system that circumnavigates the meadow. The Project is located in both Placer and Nevada counties on Donner Summit at the headwaters of the South Yuba River (Figure 1). The meadow, known as Yayalu Itdeh in Washoe, is at the intersection of three headwater streams, Lytton Creek, Upper Castle Creek, and the Upper South Yuba which supports one of the largest meadows on the west side of the Sierra Nevada. The meadow and surrounding area were utilized extensively by the Washoe Tribe before European colonization.

Background

TNF acquired the Van Norden meadow property from the Truckee Donner Land Trust in 2017. TNF and partners have been working with stakeholders, community members, and the scientific community to collect baseline data, conduct resource surveys, and plan a restoration project for several years. Today, hikers, runners, mountain bikers, fishermen, horseback riders, and cross-country ski enthusiasts utilize the meadow for year-round recreation where they enjoy views of the South Yuba headwaters and Castle Peak. The Royal Gorge Cross County Resort has managed cross-country ski trails on the meadow surface since the early 1970s. The meadow is easily accessible from Highway 80 and Old Hwy 40 along a road that is co-managed by Placer and Nevada counties and is adjacent to the communities of Soda Springs, Sugar Bowl, and Serene Lakes. A small dam at the base of the meadow, built in the 1870s and enlarged by PG&E in 1908 and again in 1916, has led to degradation to the ecosystem of Van Norden meadow, partially flooding the lower meadow and creating a small, shallow reservoir with incised channels in the upper portion of the meadow. In 1976 the reservoir was lowered, reducing the footprint of the reservoir from 5,800 acre-feet to 175 acre-feet. In 2019, the dam spillway was lowered again, reducing the reservoir footprint to under 5 acre-feet (Ascent Environmental 2019). Around 1,000 sheep grazed the meadow until the mid-1990's when the property was sold by PG&E.

Purpose and Need

The Van Norden Meadow Restoration and Recreation Project aims to rehabilitate the meadow's hydrology and formalize recreation access, thereby restoring its ecosystem function and sustainability under future climatic conditions.

Meadows provide benefits that make them biodiversity and carbon sequestration hotspots, provide late season baseflows, improve water quality and quantity for downstream users, and provide recreational opportunities. Restoration of meadow hydrology, by re-connecting the stream channel to its natural floodplain, is the primary basis upon which other ecological values will be sustained, including restoring historic riparian wet meadow, aquatic habitat, wetland function, within the meadow system.

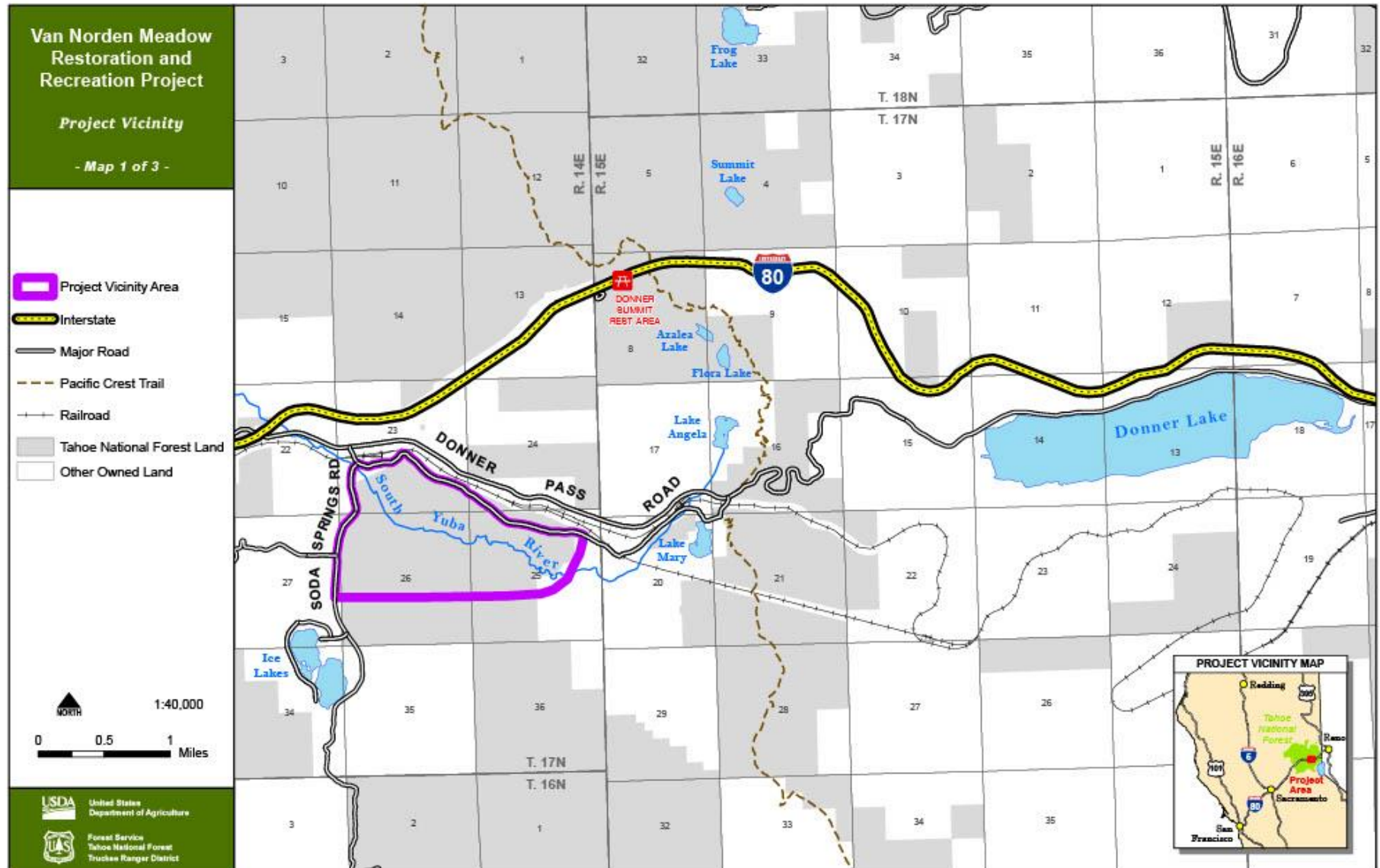


Figure 1: Vicinity map of Van Norden Meadow Restoration and Recreation Project.

With increasing demand for year-round access to Van Norden meadow, actions are needed to meet our responsibilities to protect and conserve public resources as well as promote safe and sustainable recreational opportunities on National Forest System lands. Adverse environmental impacts, such as accelerated soil erosion, soil compaction, sediment in stream channels, damage to vegetation, disturbance to sensitive wildlife species, and degradation of cultural resource concerns are occurring. Developing trailheads, parking areas, bathrooms, re-routing roads and trails, and a network of trails will mitigate the existing hydrologic and cultural resource damage resulting from unmanaged dispersed use.

The proposed actions are consistent with the 2004 Record of Decision (ROD) from the Sierra Nevada Forest Plan Amendment which identifies that the desired condition for meadow habitat should be “hydrologically functional” and where “Sites of accelerated erosion, such as gullies and headcuts are stabilized or recovering. The proposed actions will: improve habitat for a range of mammals, amphibians and reptiles, native fish, macroinvertebrates, raptors, and other important bird species, including willow flycatcher; provide hydrologic benefits such as reduced sedimentation and improved water quality, improved late season baseflow, elevated groundwater tables, expansion of wet meadow vegetation and reduction of invasive plant species and encroaching conifers; replace user-created trails and access features with a designed system that protects water quality and meadow-related resources.

Existing Condition

For over a century, grazing impacts, road-building, dam building, raising, and lowering, and other developments in Van Norden meadow and within the subwatershed have resulted in localized stream incision, wet vegetation loss, hydrologic disconnection, partial conversion from wet to dry conditions and encroachment of lodgepole pine (Balance Hydrologics 2014; Hutchinson and Weisman 2021). Degradation of a meadows hydrologic function can be directly correlated with a decline in key ecosystem services including water filtration (Woltemade 2000), flood attenuation (Loheide et al. 2009, Lowry et al. 2011), headwater storage capacity (Lord et al. 2011), greenhouse gas emissions (Blankinship and Hart 2014; Reed et al. 2020), conifer encroachment, loss of bird and other wildlife populations (McKelvey et al. 1996; Campos et al. 2020), and resilience against invasive plant species (Hammersmark et al. 2009). At present, spring runoff is primarily contained in the incised channels and moves quickly out of the system. Restoring the incised channels will improve water retention within the meadow and allow water to flow through an existing distributed channel network for a longer duration during the spring snowmelt period.



Figure 2: Spring runoff on the South Yuba River is constrained within the channel (left). Lyton Creek's banks are actively sloughing and eroding (right).

While considered native in California, Reed canarygrass (*Phalaris arundinacea*), is now recognized as an invasive species of concern in Sierra Nevada meadows (Lavergne and Molofsky 2007; Cal-IPC 2019). It was found to suppress native plant species (Barnes 1999; Lesica 1997; Weichmann 2014) and has been negatively correlated with native amphibian populations (Rowe and Garcia 2014). Reed canarygrass in Van Norden meadow covers nearly 30 acres of meadow habitat, primarily adjacent to the South Yuba River stream channel, extirpating native wetland and riparian plant species, and reducing habitat for ground nesting birds.

Lodgepole pine has been encroaching on the meadow edge and interior for several decades as a result of the disrupted hydrologic process due to dam raising and lowering, reservoir filling and lowering, channel incision and groundwater depletion, and then the removal of grazing sheep in the early 1990's. Van Norden meadow is at high risk for conifer encroachment due to the prevalence of lodgepole pine forests around the meadow, Van Norden's large snow pack, and raising summer temperatures (USFS 2020; Lubetkin et al. 2017). Historically lodgepole pine forests ringed the meadow and supported an understory of grasses and riparian shrub lined seasonally wet channels that flowed into the meadow. Today these forests are unsustainably dense, shading and suppressing riparian hardwoods and creating a fuels hazard. There is a need to reduce conifer density in these surrounding forests to reduce fuels and restore riparian vegetation.

There is approximately 4.5 miles of road and trail encircling Van Norden meadow that intersect over two dozen, snowmelt fed seasonal and perennial streams. Drainage across these routes creates flow impediments and sediment sources that have water quality impacts on the meadow. Van Norden Dam Road is under joint Placer County/Nevada County ownership and the PG&E Road is on USFS land with a PG&E easement. The cross-meadow road is owned by the USFS with easements held by Sugar Bowl and PG&E.

The meadow is visited year-round by thousands of users and serves as a winter recreation area with over 11 miles of groomed cross-country ski trails managed by Sugar Bowl/Royal Gorge. During rain-on-snow events or because of spring snowmelt, grooming is often suspended. Rain-on-snow weather

events regularly impact snow grooming operations at Van Norden meadow, and along with increasing temperatures due to climate change, will ultimately drive operational impacts in the future. The meadow itself is a popular area in summer with users ranging from mountain bike enthusiasts, horseback riders, fishermen, school groups, and day hikers. Existing trails around the meadow are either user-created trails, county roads, or utility roads. Currently many user-created trails are damaging both ecological and cultural resources. There is an opportunity to formalize access to this popular area in conjunction with the meadow restoration plan.



Figure 3: Groomed cross-country trail in winter (left). Cross-country trail in summer with user created two-track. This existing trail alignment would become part of the proposed trail network (right).

Desired Condition

The proposed actions will restore high functioning headwater wetland habitat and improve hydrologic function while supporting year-round recreational activities in this high elevation meadow. With increasing periods of drought, providing wet habitat for high elevation aquatic species and migratory birds, along with high quality forage for terrestrial wildlife, will become increasingly important to support wildlife adaptation in a changing climate. Restoring incised stream channels will recover surface and groundwater hydrologic processes, including prolonging and expanding meadow surface inundation, dispersing flow to more than a single high flow channel, delaying peak flows at the outlet, improving downstream water quality, and recharging groundwater to improve groundwater levels. The proposed actions will enhance the ecological and aesthetic values of the meadow, mitigate damage from dispersed use, and provide a managed trail system and amenities to support year-round access to the meadow while preventing further resource damage.

Climate predictions for the area show an increase in rain-on-snow events and increasing temperatures due to climate change (USFS 2020). Winter season (November-March) stream flow is characterized as baseflow within Van Norden meadow and is not expected to change because of this project. In considering the degree that the proposed actions may impact snow grooming, 2D hydrologic models demonstrate that surface water may be present under more sections of groomed ski trails during the spring snowmelt period or during rain-on-snow-events. The model also predicts that by spreading

surface water over a larger area, localized sections of groomed ski trails will see reduced surface water depth during the spring snowmelt. If necessary, the proposed action provides for the establishment of reroutes that may be authorized through the special use authorization where sufficient snow-depth exists.

This project aims to achieve the following desired conditions for hydrology, ecology, and recreation:

Hydrology

- Sustained hydrologic connection that supports ecological function across distinct hydrogeomorphic wetland types within the 485-acre, high elevation meadow
- Delayed spring recession period and increased groundwater levels to support aquatic and terrestrial wildlife species and wetland plant species, providing refuge as the climate changes
- Preventing erosion risks that would impact downstream water quality

Ecology

- Increased willow habitat for birds, like the willow flycatcher
- Increased beaver presence and activity contributing to long term wetland habitat resilience
- Increased carbon sequestration
- Decreased extent of reed canarygrass
- Decreased lodgepole pine encroachment
- An open lodgepole pine forest with a lush understory and functional riparian habitat along seasonal streams.

Recreation

- A formalized network of trails that includes trailheads, parking areas, restroom facilities, interpretive panels, and viewing platforms that minimizes damage to resources.
- Sustained groomed cross-country ski trails

Proposed Action

The project will restore 485 acres of meadow and meadow edge habitat—of which, 335 acres are open meadow and 150 acres are dominated by conifer. There are four categories the proposed actions fall under: stream channel restoration, conifer treatment, road improvements and mitigations and recreation improvements. Table 1 lists the proposed actions associated with each category.

Table 1: Summary of proposed actions and estimated acres and miles.

| | <i>Proposed Action</i> | <i>Acres/Miles</i> |
|-----------------------------------|--|--------------------|
| <i>Stream Channel Restoration</i> | Stream Channel Fill | 1.75 mi |
| | Stream Channel Partial Fill and BDA/PALS | 1.5 mi |
| | Lytton Fan Restoration | 0.25 mi |
| | Reed Canary grass treatment | 20 ac. |
| | Surface Roughness Features | 0.1 ac. |
| | Dam Degrade/Borrow Area | 3.5 ac. |
| <i>Conifer Treatment</i> | Conifer Removal | 58.4 ac. |
| | Conifer Thinning | 56.2 ac. |
| | Aspen Enhancement | 0.5 ac. |
| <i>Road Improvements</i> | Van Norden Dam Road | 1.8 mi |
| | PG&E Road | 2.2 mi |
| | Meadow Bisect Road | 0.12 mi |
| | Meadow Bisect Road Decommissioning | 0.27 mi |
| | Meadow Bisect Road Re-Route | 0.22 mi |
| | Meadow Bisect Bridge Replacement | 0.04 mi |
| <i>Recreation Improvements</i> | Trail Construction | 4.65 mi |
| | Trailheads and Parking Areas | 3 ac. |
| | Rehabilitation of user-created trails | 1.0 mi |
| | Trail Construction | 4.65 mi |

Equipment used to implement the proposed actions would be chosen to minimize resource impacts. Equipment may include tractors, loaders, excavators, dump/haul trucks, and masticators. Follow-up revegetation will occur along routes, in staging areas, reed canarygrass removal areas, tree removal areas, and within the dam degrade area using available sod mat, seeding, sedge plugs, and willow pole plantings. All disturbed staging areas would be mulched and seeded with native materials. Revegetation is expected to occur in up to 56 acres of the project. The planting palette used for the project site will incorporate both the Climate Smart Restoration Planting tool (Vernon et al. 2019) as well as work completed on the lipid value of specific plants at Van Norden by University of Nevada,

Reno researchers (Vaudo et al. 2020; Vaudo and Leonard, in prep). Additionally, revegetation efforts may include sedge (*Carex utriculata* and *Carex nebrascensis*) plugs and/or mats, and willow (*Salix lemmonii*) staking.

Stream Channel Restoration

Construction is likely to last up to ten weeks per season and is scheduled for the late summer (after August 15) to avoid instream work during the fish spawning season. The South Yuba River commonly has standing pools but is limited to no flowing water during the planned construction period; a dewatering plan will be developed based on these conditions. Upper Castle Creek has perennial water, but instream work would be limited to beaver dam analogs (BDA) and pole assisted log structures (PALS), dewatering will be planned accordingly. Lytton Creek, implementation planned for the second construction season, is anticipated to be dry during the construction period and no dewatering would be necessary. Surveys for fish and other aquatic organisms will be conducted prior to diversion and subsequently removed from the area to be dewatered in accordance with a CDFW approved dewatering plan. Any localized water re-routing would be minimized in both time and space to the greatest extent possible. Temporary diversion construction activities would minimize downstream turbidity according to the Stormwater Pollution Prevention Plan (SWPPP). A post-project erosion control plan would be developed and implemented. Where necessary a downstream siltation structures and sump stations would be placed to control sediment and provide for clear discharge out of the project area during implementation.

Channel Fill

Fill stream channels along 2.38 miles of the South Yuba, 0.37 miles of Lytton Creek and 0.04 miles of Castle Creek to match floodplain elevations and allow for hydrologic connectivity with existing distributary channel network.

Partial Channel Fill and Beaver Dam Analog/Pole Assisted Log Structures

Partially fill or place BDA/PALS along 0.82 miles of South Yuba, 0.23 miles of Lytton Creek and 0.23 feet of Castle Creek to match floodplain elevations and allow for hydrologic connectivity with existing distributary channel network.

Lytton Fan Restoration

Lytton Creek has several small channels that are disconnected from the alluvial fan because of the parking area and areas adjacent to the Van Norden Dam Road. To reconnect the disconnected stream segments on the Lytton Fan actions will include degrading and reconstructing approximately 0.2 miles of the Van Norden Dam Road and degrading and relocating the existing parking area. The degraded areas would be blended with the natural topography and de-compacted to approximately 18" with an excavator, mulched and seeded or otherwise revegetated after project implementation. The existing parking lot would be relocated to a drier area, to the east of Lytton Creek.

Reed Canarygrass Treatment

Treatment of reed canarygrass will be a multi-year, adaptive management effort that will include the following treatment prescriptions. 1) Reed canarygrass seed heads would be clipped, bagged, and

disposed of for 1-2 years in advance of stream restoration and in the years following stream restoration to reduce future seed availability. 2) During the stream restoration, mechanically scrape the top 3" of soil to remove shoots and roots of reed canarygrass within the inset floodplain and place material in the bottom of to be filled stream segments and buried by additional fill. 3) Scraped areas would be revegetated using available sod mat, seeding, sedge plugs, and willow pole plantings. 4) Select areas would be tarped using thick black or clear plastic soon after snowmelt and left in place for one growing season. Tarped areas would be revegetated using available sod mat, seeding, sedge plugs, and willow pole plantings

Surface Roughness Features

Surface roughness features will be added to slow flow and reduce potential for erosion. Surface roughness will be created on top of channel fill and stripped areas by planting vegetation, installing salvaged meadow vegetative mats (harvested sod), installing harvested logs (embedded logs), and by installing select rocky material. Embedded logs are intended to redirect flow to limit potential for channelization in newly placed channel fill. Harvested sod and revegetation are intended to slow flow and to anchor soil via rooting.

Dam Degrade/Borrow Area

Approximately 3.5 acres of the existing dam berm will be removed and brought to less than 3 feet above meadow grade. A gently sloping grade will be retained to the highest point to allow for trail construction. Dam material will be sorted, mixed with chips from tree removal efforts (Wolf et al. 2020) and utilized in the project as fill material. Any unusable material will be removed from the site as waste.

Conifer Treatment

Up to 120 acres of conifers (primarily lodgepole and some white fir) would be removed or thinned to restore the meadow surface, aspen and the surrounding forest. Within the Project area conifers would be removed using hand or mechanized equipment including but not limited to: feller bunchers, skidders, chippers, masticators, end or long lining, tracked and rubber tired machinery, and other typical aerial or ground-based logging machinery. Conifers may be disposed of through: chipping, hand or grapple piling for burning, mastication, decking for public fuelwood cutting, sold as commercial fuel wood, biomass removal, and/ or incorporation into fill material for stream



Figure 4: Van Norden forested area on edge of meadow (left). An area where forest edge and meadow encroaching conifers meet (middle). Conifers that have encroached into the meadow (right).

restoration activities. Conifers would be completely severed below the lowest live branch to a maximum height of 8 inches above the surface. The area would be allowed to revegetate naturally.

Meadow Conifer Removal

Within the “Conifer Encroachment zone” (see maps in Appendix A, Figure 10), all conifers would be removed except in the area of the Royal Gorge cross-country ski trail where the following prescription would be applied.

Conifers along the ski trails would be thinned, rather than removed, to retain desirable shade for cross country ski user groups. Adjacent to the cross-country ski trail alignment to 25 feet from the trail, thin conifers to an average spacing of 10 feet as measured to the bole of the tree. Spacing should be variable and range from 5 – 15 feet to promote a natural aesthetic. Feather the edge away from the ski trail so that conifer density is reduced further away from the trail. In thinned areas adjacent to the Royal Gorge cross-country ski trail, retain the healthiest most vigorous lodgepole pine.

- Retained pines should be vigorously growing and have healthy full crowns with high live crown ratios (>40%) which are not chlorotic or fading. Retain pines which are free of pests, pathogens, and defects
- Equipment exclosure zones: Some conifers would remain where mechanized equipment is not permitted. These are as may be thinned by hand.

Forest Thinning

Forest thinning would focus on removing smaller conifers (less than 24 inches DBH), however conifers greater than 24 inches may be cut if they are infected with pests or pathogens, have weak chlorotic crowns, or are fading/dying. Tree removal would follow a “thin from below” strategy which progressively removes the smallest diameter trees until desired conditions are met. Tree selection may deviate to encourage spatial heterogeneity or where larger trees are unhealthy, infected with pests or pathogens, have weak chlorotic crowns, and/or are dying. Within 10 feet of the dripline of healthy, vigorous large diameter (>24 inches DBH) trees all trees less than 24 inches would be removed. Within 50 feet of the roads and private property trees should be limbed to 6 feet or ½ the height of the tree, whichever is less. Slash from limbs and boles would be removed to the extent possible. Thin all conifers less than 12 inches DBH to a 25-foot spacing

1. Within 50-75 feet of riparian vegetation including but not limited to: cottonwood, aspen, willows, alder, thin all conifers less than 30 inches DBH
2. Remove trees up to 30 inches DBH which are significantly infected by pests or pathogens, have weak or chlorotic crowns and/ or are in imminent threat of mortality
 - a. Trees which are removed for forest health reasons should be removed if they have a spreadable pest or pathogen such as mountain pine beetle or dwarf mistletoe or will experience imminent mortality (<5 years) if left in the stand.
3. Retain denser clumps of trees around wildlife habitat areas where mechanized equipment is not permitted
 - a. Within wildlife habitat areas thin trees less than 10 inches DBH by hand, do not remove larger material where it cannot be removed from the unit
4. Within 50 feet of roads and property boundaries prune all trees up to 6 feet or no more than ½ the height of the tree, whichever is less.
5. Work may be accomplished using hand or mechanized equipment including but not limited to feller bunchers, skidders, chippers, masticators, tracked and rubber-tired machinery, and other typical logging machinery
6. Conifers cut by hand within the wildlife habitat enhancement areas should be removed from the stand, chipped within the stand, or piled to be burned at a later date
7. Trees greater than 14 inches in diameter would be treated with a borax compound to prevent the Heterobasidion root disease from infecting cut stumps
8. Conifers will be completely severed below the lowest live branch to a maximum height of 8 inches above the surface

Conifer Regeneration Abatement

Within the meadow area raising the groundwater levels may promote some lodgepole mortality over time, assisting in managing future encroachment. However, a long-term management strategy is

warranted to address future conifer encroachment as it is likely to recur in dryer areas of the meadow where/if the groundwater does not rebound. An adaptive management approach to future conifer encroachment is warranted due to this uncertainty. Abatement of conifer seedlings would be addressed through a combination of hand removal, lop and scatter or broadcast burning.

Road Improvements and Staging areas

All access routes and staging areas utilized would be blended with the natural topography and de-compacted to approximately 18" with an excavator, mulched and seeded or otherwise revegetated after project implementation. The designated temporary access routes and staging areas would be designed to minimize effects to resources in the area (plants, wildlife, etc.). Mitigating measures such as designed access routes that retain existing vegetation and that limit equipment movement into sensitive areas will be the primary means of reducing impact. In areas where more impact may be required to attain stated goals, steps to reduce compaction and restore complementary topography will be employed along with active revegetation. Other methods employed to minimize and mitigate effects to resources on these routes and staging areas will be detailed in permitting and erosion control plans required in association with this action. Repair, maintenance, re-alignment, or decommissioning of existing routes and trails is needed to reduce future resource damage. Decommissioning and realignment activities are designed to promote natural recovery of the road surface by restoring the natural hydrologic function of the soil and reducing runoff and erosion.

Van Norden Dam Road and PG&E Road Improvements

Construct low water crossings, install culverts, create drivable dips, out slope the road, and replace bridges at drainages where sediment movement or erosion is present along Van Norden Dam Road and the PG&E Road to improve hydrologic connectivity and reduce sediment delivery from road.

Meadow Bisect Road Improvement

Construct low water crossings or install culverts at drainages and add fill along approximately 0.12 miles of road to improve hydrologic connectivity and reduce sediment delivery from road. Decommission approximately 0.27 miles of road within the meadow and replace with a 240-foot bridge and 0.05 miles of road on the meadow to allow for hydrologic connectivity. Re-align/construct 0.22 miles of road on the upland glacial moraine to retain connectivity with PG&E Road and trails system.



Figure 5: Hikers walking along the meadow bisect road.

Temporary Access Routes and Staging Areas

Access routes and staging areas for construction equipment were designated to reduce the distance equipment would need to travel while reducing impacts to resources. In wetter sites designated routes and crossings would adhere to Best Management Practices (BMPs), Management Requirements (MRs) and SWPPP (Storm Water Pollution Prevention Plan) to minimize soil and drainage disturbance, the potential for erosion, and enhance restoration success. Equipment would access the project area on the designated access routes illustrated on Figure 10 in Appendix A. Designated temporary access routes cover approximately 2 acres. Equipment staging would be in the parking area at the west end of the meadow and at the current Sheep Pens Parking Area; smaller staging areas will be established within the meadow for the South Yuba bridge replacement on the Meadow Bisect Road.

Recreation Improvements

Recreation improvements will be designed to meet the Forest Service Trail Accessibility Guidelines and ensure that all new or altered trails connect directly to a trailhead and comply with the federal and Forest Service access and adhere to Best Management Practices (BMPs), Management Requirements (MRs) and SWPPP (Storm Water Pollution Prevention Plan) to minimize soil and drainage disturbance, the potential for erosion, and enhance restoration success.

Trail Construction

A trail network will be constructed to circumnavigate Van Norden meadow. New trail construction will connect portions of existing user created trails where the alignment does not impact meadow-related resources. User created trails not adopted into the new formalized system will be restored using native materials such as pine needles, rocks, and woody debris. The trail network would include two trailhead access points, one near the old dam and the other near the Sheep Pen area (see maps in Appendix A, Figure 11). Trail users would be able to walk, bike, or horseback ride along the north and east sides of the meadow and have three options to experience the south side of the meadow. They could choose a longer loop that builds in elevation to the ridge along the South side of the meadow,

connecting to a proposed section of the Donner Lake Rim Trail/Memorial Overland Emigrant Trail, or a mid-slope red fir forest option with filtered views of the meadow, or choose a shorter, lower gradient route that follows the PG&E powerline road. Providing sustainable trail access to the ridge would reward visitors with an expansive view of the meadow and surrounding mountains.



Figure 6: View of Van Norden Meadow along the proposed longer loop trail that ascends to the ridge along the Southern boundary.

Where necessary, user-created trail will be improved to address existing issues associated with drainage and other resource damage. This would include construction of low water crossings, short sections of boardwalks, and bridges. Both minor and major trail bridges will be constructed to meet the Trail Management Objectives developed for each trail. Bridges will be constructed using Forest Service standard trail bridge plans and built to meet snow load standards.



Figure 7: Example of a minor trail bridge design (left) and a major trail bridge design (right) both designed to be aesthetically pleasing and to withstand heavy snow loads.(photo credit USDA Forest Service, National Technology and Development Program).

Viewing Platforms and Interpretive Signage

Viewing platforms with interpretive signage will be incorporated into the trail design to enhance birding and wildlife viewing opportunities that are accessible to a diverse array of recreationists. These platforms will be wood/metal construction and will include a space to sit. The platforms will create a more immersive experience for trail users who will access platforms from the trail and will encourage users to stop, rest, and experience the meadow and surrounding landscape. Viewing platforms will be placed at several locations within the meadow, including: the old dam berm, within the conifer encroachment area on the north side of the meadow, and on the south side of the meadow bisect road (see maps in Appendix A, Figure 11).

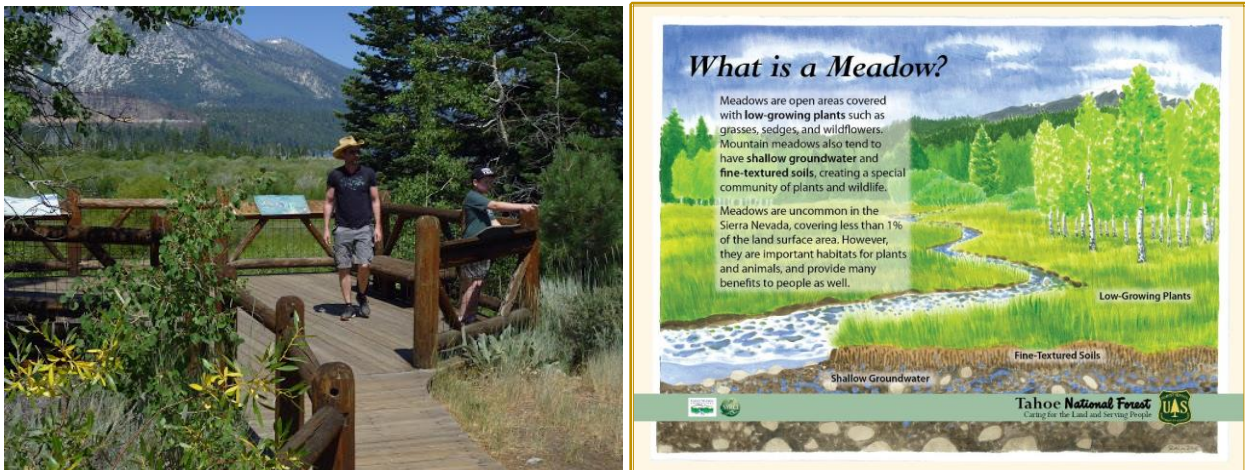


Figure 8: Example of a viewing platform (left) and interpretive signage (right)

Fencing

Fencing that is aesthetically integrated with Van Norden meadow (e.g. buck and rail) may be utilized where necessary to delineate parking limits and serve as a design element to interpret conservation of

resources and sustainable recreation access. Fences will be constructed using natural materials such as lodgepole pine poles harvested onsite, cedar split rails or other wood poles and constructed to withstand heavy snow loads.



Figure 9: Example of buck and rail- style fencing that is built to withstand snow loads.

Trailheads and Parking Areas

Two trailheads and parking areas would be constructed to accommodate public access on the west and north sides of the meadow. Parking lot construction would include spaces for at least 20 vehicles, include a trailer turn-around, trailhead signage, and restroom facilities. The first trailhead, parking area would be located adjacent to the PGE substation where the current dam berm and spillway exists (see maps in Appendix A, Figure 11). The existing berm would be decommissioned, and the material would be used as a fill source for meadow restoration.

An additional trailhead and parking area would be constructed on the north side of the meadow near the old sheep pens area (see maps in Appendix A, Figure 11). This area is currently used as a parking area but in its current location disrupts Lytton Creek's hydrologic flows. Relocating the existing parking lot 1/10 of a mile to the east along the Van Norden Dam Road would reactivate the alluvial fan and meet the meadow restoration goals as described on page 8 and 9.

Cross Country Ski Groomed Trails

This proposed action provides for the establishment of reroutes that may be needed where groomed trails are impacted by rain-on-snow events that are expected to increase (USFS 2020). Reroutes would be authorized through the special use authorization process. Reroutes would be placed where sufficient snow-depth exists and where grooming operations can resume without causing resource damage.

Laws, Regulations, and Other Direction

All management practices and activities of the proposed action are consistent with management direction, including standards and guidelines, in the Tahoe National Forest Land and Resource Management Plan (June 14, 1990), as amended by the Sierra Nevada Forest Plan Amendment Record of Decision (January 2004), which were developed in accordance with the National Forest

Management Act of 1976, 16 USC 1604(i) and 36 CFR 219.10(e). This proposed action is designed to meet the Riparian Conservation Objectives, sections 401 and 404 of the Clean Water Act, and other relevant Federal and State laws and regulations. This project also aligns with the Region 5 Ecological Restoration Leadership Intent (USDA FS, 2011).

As outlined in the 36 CFS 220.6 and Forest Service Handbook 1909.15, section 30, a proposed action may be categorically excluded from further analysis and documentation in an environmental impact statement (EIS) or environmental assessment (EA) only if there are no extraordinary circumstances related to the proposed action. The Van Norden Meadow Restoration and Recreation Project fits under the following Excluded Categories.

- 36 CFR 220.6 (e)(1) *Construction and reconstruction of trails*
- 36 CFR 220.6 (e)(6) *Timber stand or wildlife improvement activities that do not include the use of herbicides or do not require more than 1 mile of low standard road construction.*
- 36 CFR 220.6 (e)(7) *Modification or maintenance of stream or lake aquatic habitat improvement structures using native materials or normal practices.*
- 36 CFR 220.6 (e)(18) *Restoring wetlands, streams, riparian areas or other water bodies by removing, replacing, or modifying water control structures such as, but not limited to, dams, levees, dikes, ditches, culverts, pipes, drainage tiles, valves, gates, and fencing, to allow waters to flow into natural channels and floodplains and restore natural flow regimes to the extent practicable where valid existing rights or special use authorizations are not unilaterally altered or canceled.*
- 36 CFR 220.6(e)(20) *Activities that restore, rehabilitate, or stabilize lands occupied by roads and trails, including unauthorized roads and trails and National Forest System roads and National Forest System trails, to a more natural condition that may include removing, replacing, or modifying drainage structures and ditches, reestablishing vegetation, reshaping natural contours and slopes, reestablishing drainage-ways, or other activities that would restore site productivity and reduce environmental impacts.*
- 36 CFR 220.6(e)(22) *Construction, reconstruction, decommissioning, or disposal of buildings, infrastructure, or improvements at an existing recreation site, including infrastructure or improvements that are adjacent or connected to an existing recreation site and provide access or utilities for that site. Recreation sites include but are not limited to campgrounds and camping areas, picnic areas, day use areas, fishing sites, interpretive sites, visitor centers, trailheads, ski areas, and observation sites. Activities within this category are intended to apply to facilities located at recreation sites managed by the Forest Service and those managed by concessioners under a special use authorization.*

An extraordinary circumstance is when a 'normally excluded action may have a significant environmental impact (40 C.F.R. 1508.4). Resource conditions that should be considered in determining whether extraordinary circumstance related to the proposed action warrant further

analysis and documentation will be assessed and a determination would be made if this project warrants further environmental analysis in either an EA or an EIS.

Responsible Official, Timeline, and Decision to Be Made

The Van Norden Meadow Restoration Project is located on NFS lands managed by the Truckee Ranger District, Tahoe National Forest. The Truckee District Ranger is the Responsible Official who would be making the decision for this project.

A decision on this project would be made by the Fall of 2021. Construction could begin in late summer 2022 and continue through the dry seasons of 2023 and 2024.

The decision to be made is whether to implement the proposed action as described above, to vary the design of the project to meet the purpose and need while addressing issues raised in public scoping, or to take no action at this time.

References

- Ascent Environmental, Inc. 2019. Final Environmental Impact Report for the Van Norden Dam Spillway Modification Project. State Clearinghouse No. 2018012053.
<https://www.mynevadacounty.com/DocumentCenter/View/28010/Van-Norden-Dam-Final-EIR-U16-003-MGT16-010-EIS16-003>
- Balance Hydrologics, Inc. 2014. Lake Van Norden and Van Norden Meadow Assessment Report.
- Barnes, W.J. 1999. The rapid growth of a population of reed canarygrass (*Phalaris arundinacea* L.) and its impact on some riverbottom herbs. *Journal of the Torrey Botanical Society* 126: 133–138
- Blankinship, J., & Hart, S. 2014. Hydrological Control of Greenhouse Gas Fluxes in a Sierra Nevada Subalpine Meadow. *Arctic Antarctic and Alpine Research*, 46(2), 355-364.
- Cal-IPC. 2019. Impacts of Invasive Plants on Sierra Meadows: Research Review and Recommendation for Future Study. Report to the National Fish and Wildlife Foundation. 46pp. https://www.cal-ipc.org/solutions/research/sierra_meadows_research_study/
- Campos, BR, RD Burnett, HL Loffland, RB Siegel. 2020. Bird Response to hydrologic restoration of montane riparian meadows. *Restoration Ecology*. 28(5): 1262-1272.
<https://doi.org/10.1111/rec.13212>
- Hammersmark C.T., Rains M.C., Wickland A.C. & Mount J.F. 2009. Vegetation and water-table relationships in a hydrologically restored riparian meadow. *Wetlands*, 29, 785- 797.
- Hutchinson, RA and A Weisman. 2021. Van Norden Meadow Watershed Assessment: Disturbance Inventory and Restoration Priorities. Report to California Department of Fish and Wildlife.
- Lavergne, S. & Molofsky, J. 2007. Increased genetic variation and evolutionary potential drive the success of an invasive grass. *Proceedings of the National Academy of Sciences*, 104, 3883–3888.
- Lesica, P. 1997. Spread of *Phalaris arundinacea* (reed canarygrass) adversely impacts the endangered plant *Howellia aquatilis*. *Great Basin Naturalist*. 57:366-368
- Loheide, S.P., Deitchman, R.S., Cooper, D.J., Wolf, E.C., Hammersmark, C.T. & Lundquist, J.D. 2009. A framework for understanding the hydroecology of impacted wet meadows in the Sierra Nevada and Cascade Ranges, California, USA. *Hydrogeology Journal*, 17, 229-246.
- Lord M.L., Jewett D.G., Miller J.R., Germanoski D. & Chambers J.C. 2011. Hydrologic Processes Influencing Meadow Ecosystems. USDA Forest Service General Technical Report RMRS-GTR-258, 44-67.
- Lowry, C.S., Loheide, S.P., Moore, C.E., & Lundquist, J.D. 2011. Groundwater controls on vegetation composition and patterning in mountain meadows. *Water Resour. Res.*, 47, 16.
- Lubetkin KC, AL Westerling, and LM Kueppers. 2017. Climate and landscape drive the pace and pattern of conifer encroachment into subalpine meadows. *Ecological Applications* 27(6): 1876-1887.
- McKelvey, K.S., Skinner, C.N., Chang, C., Erman, D.C., Husari, S.J., Parsons, D.J., van Wagtendonk, J.W., & Weatherspoon, C.P. 1996. *An overview of fire in the Sierra Nevada. Sierra Nevada Ecosystem Project: Final Report to Congress. Vol II*. Davis, CA: University of California, Centers for Water and Wildland Resources.
- Reed, CC, AG Merrill, WM Drew, B Christman, RA Hutchinson, L Keszei, M Odell, S Swanson, PSJ Verburg, J Wilcox, SC Hart, and BW Sullivan. 2020. Montane Meadows: A Soil Carbon Sink of Source. *Ecosystems* <https://doi.org/10.1007/s10021-020-00572-x>

Appendix A – Maps

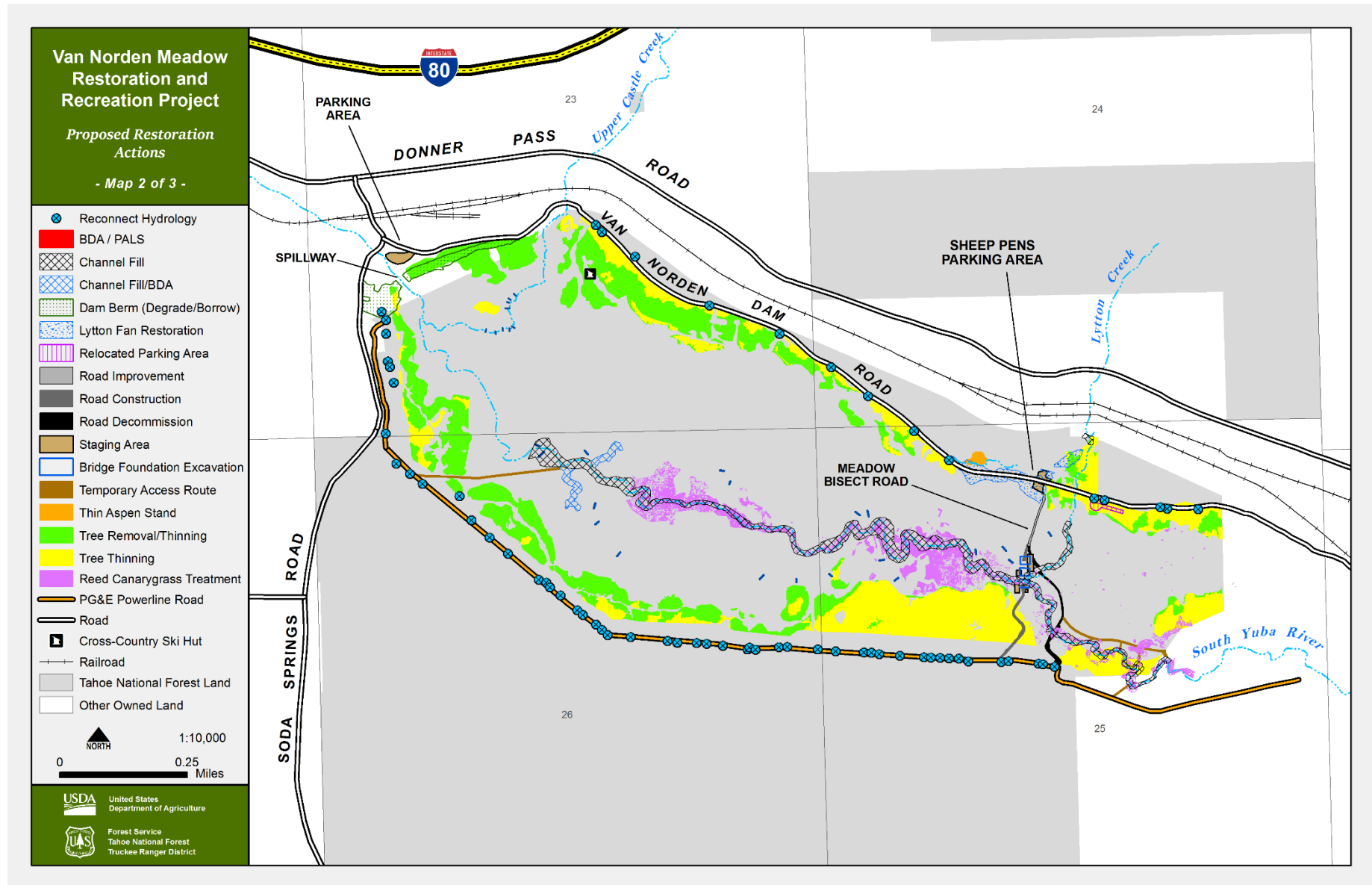


Figure 10: Map of Van Norden Meadow Restoration actions.

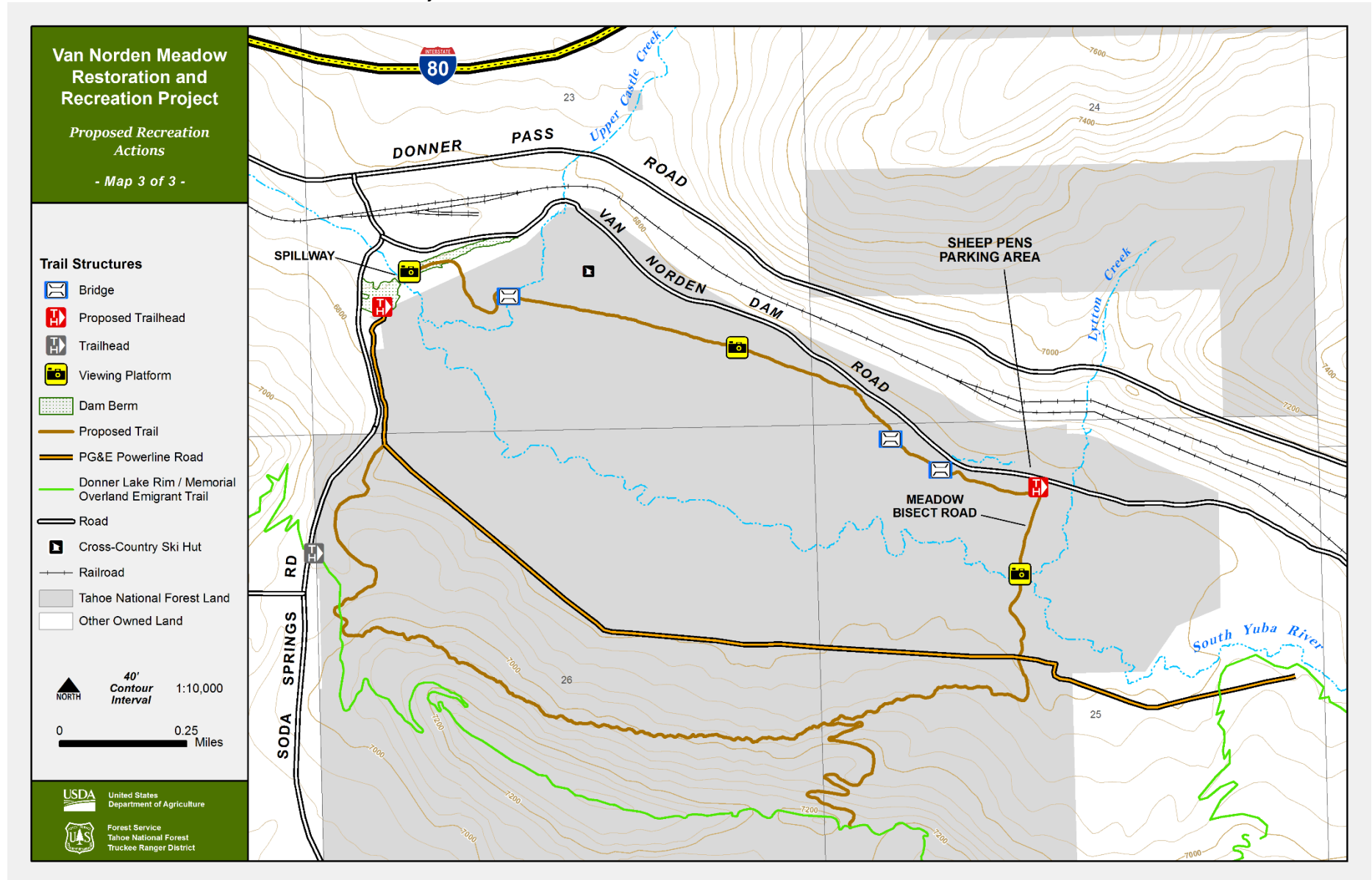


Figure 11: Map of Van Norden Meadow Recreation improvement actions.